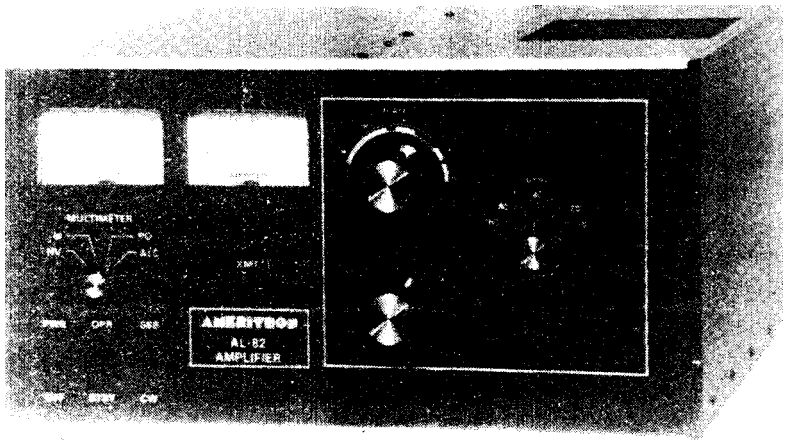
AMERITRON AL-82

FULL POWER LINEAR AMPLIFIER

INSTRUCTION MANUAL



The Ameritron AL-82 is a 1500 watt output linear amplifier that operates from 160 through 15 meters. The Ameritron AL-82X is the export model and covers 160 through 10 meters. The AL-82J is the export model for Japan and covers 160 through 10 meters. The AL-82/X/J uses two 3-500Z tubes in a class AB2 grounded grid circuit. CW, FM and RTTY efficiency is improved by shifting the bias deeper into class B. The heavy duty power supply and RF components, combined with a forced air system utilizing chimneys, provide long service life for expensive components. The AL-82/X is shipped factory wired for 240 volt, 50/60 Hz power mains. The AL-82J is shipped factory wired for 200 volt, 50 Hz power mains.

PLEASE READ THIS MANUAL BEFORE OPERATING THIS EQUIPMENT!

AMERITRON

116 Willow Rd.
Starkville, MS 39759
U.S.A.

Rev. 3

UNPACKING INSTRUCTIONS

1. Carefully remove the amplifier, transformer, and tube from their shipping cartons. Inspect each item for visible damage. If any damage occurred during shipment, notify the transportation company immediately.

2. Save all packing materials in case you need to return your AL-82/X/J for factory service. The cartons have been designed to give maximum protection for this amplifier. Any units returned without proper packing may be damaged and shipping claims cannot be made. Contact the factory before returning any units.

3. Remove the screws that hold the cover to the amplifier. Slide the cover back and remove it from the amplifier. Remove the package that is in the space where the transformer will be installed. This package contains two chimneys for the 3-500Zs. Follow the Tube Installation steps on page 5 to properly install the chimneys. There is a small bag that contains the fuses, fuse caps and the remainder of the chassis screws wrapped in the packing material around the anode connectors.

4. Please read the GENERAL INFORMATION and SPECIFICATIONS sections before attempting to install the transformer and tube. Go to the INSTALLATION section on page 4 to begin installing the transformer and tube.

5. This amplifier must always be disconnected from the power mains before removing the cover. See the precaution on page 10. Please read the entire manual to become familiar with the operation of the AL-82/X/J amplifier before attempting to operate this equipment.

NOTE: The AL-82J is the Japanese export version of the AL-82 amplifier. The AL-82J utilizes a special power transformer for use with 200V AC, 50 Hz. The AL-82J will perform to specifications when the special transformer supplied is installed and it will cover 160 through 10 meters.

FEATURES

1. Inexpensive tubes: the AL82 uses a pair of rugged 3-500z tubes.

2. Fast warm-up time: the 3-500z requires only a few seconds of warm-up time.

3. SSB/CW switch: the bias voltage is switched to provide the best linearity on SSB or the lowest dissipation on CW operation.

4. ALC Indicator: the drive level is detected to provide a control voltage for the exciter. ALC prevents over-driving of the linear and reduces distortion from excessive drive power.

5. Vernler Plate and Load Adjustments: both tuning controls have vernler 6:1 reduction drives for smooth tuning.

6. Two Illuminated Panel Meters: the AL-82 has two illuminated panel meters. The Grid Current meter provides a continuous reading of grid current and indicates proper operation of the amplifier. The other meter reads Plate Voltage (HV), Plate Current (IP), Peak RF Watts (P O) and ALC.

7. Operate/Standby Switch: filament and plate voltages are maintained while allowing the amplifier to be bypassed for "barefoot" operation.

8. 12 Volt Auxiliary Jack: 12 volts at 100 mA is provide for accessories such as the ATR-15 Antenna tuner.

9. XMT Indicator LED: provides a front panel indication of proper amplifier keying by the exciter during operation.

Caution: This amplifier must be disconnected from the power mains before removing the cover. See the warning on page 10.

TECHNICAL SPECIFICATIONS AL-82

Input
Circuit type: Pi-network, slug tuned coils
maximum VSWR at resonance: 1.2:1 minimum 2:1
VSWR bandwidth: 20% maximum drive power
permissible: 130 watts typical drive for full power
output: 100 watts

Output
circuit type: Pi-L, Pi
1/2 hour continuous carrier: 1500 watts (Below 18mHZ)
30 second continuous carrier: 1800 watts plus
1/2 hour PEP two-tone test: 1800 watts
30 second PEP two-tone test:1800 watts plus

Power Supply

circuit type: full wave bridge, capacitor input no load voltage: 3800V
full load voltage: 3300V full load current: .8 amp
regulation: 10% or better transformer: 32 lbs., hypersil
capacitors: 26 mfd total, computer grade maximum
draw at rated output: 13 amps at 240V AC -50/60 Hz

Tube
type (2) 3-500Z continuous dissipation: 1000
watts warm-up time: approximately 30
seconds

Metering: multimeter: plate current, plate voltage, drive/ALC, power output (PEP watts). Grid: grid current

ALC: negative going, 0-20V, adjustable, phono jack

Efficiency CW: 65% typical

Efficiency SSB (envelope crest): 62% typical

MARSIWARC: yes, bandswitch set to nearest amateur band

Keying: requires relay closure or sinking to ground of positive (+) 12 VDC at 100 mA, phono jack

RF Connectors: S0239

Line Connector: NEMA 6-15P 240V style

Dimensions: 18 1/2" D x 17" W x 10"H

Weight: 77 lbs.

Frequency Coverage: (AL-82)-1.8, 3.5, 7, 14, 18 and 21 MHz. User modified models cover 24 and 28 MHz. (AL-82X/J)Export models-1.8, 3.5, 7, 14, 18, 21, 24 and 28 MHz.

Third Order IMD at Rated Output: -34 dB at 1500 w output

GENERAL INFORMATION

SAFETY INTERLOCK

While the Amplifier's top cover is in place, the interlock switch closes to allow AC line voltage to reach the power transformer. When the top cover is removed, the interlock opens and disconnects the line voltage. This does not discharge the bank of power supply filter capacitors. Be sure to allow the filter capacitors to discharge before you touch anything inside the Amplifier. You can select the High Voltage function of the Multimeter to check the high voltage potential. Never attempt to defeat the safety interlock. ***WARNING- Never remove the cover of this amplifier with the unit plugged into the power line.***

DRIVING POWER

This Amplifier is designed to operate at full ratings when it is driven by an exciter that has approximately 100 watts of RF output. You can use an exciter that has lower output power, but the Amplifier's output will be less. If you use an exciter that delivers more than 100 watts, carefully adjust the driving power to avoid "over drive" and the creation of spurious signals, which create needless interference to other operators. We highly recommend that you use a monitor scope for continuous output monitoring. The display on an oscilloscope is the best way of determining the amplitude of the voice peaks which, if excessive, can cause "flat topping" and splatter.

IMPORTANT: In no case should you advance the power output control of your exciter beyond the point where the Amplifier's Power Output indication ceases to increase. If you turn the control past this point, nonlinear operation may occur.

FILAMENT SUPPLY

The filament circuit of this amplifier satisfies all requirements of the tube manufacturer related to tube performance and life. Inrush current is controlled by the transformer internal resistance and impedance, filament choke resistance and filament wiring resistance. To insure maximum life of the tube never replace any circuit components or wiring with substitute parts.

The low voltage tap on the filament transformer primary provides the ability to operate the blower at slower speeds for reduced noise. Normal amateur operation in CW and SSB will not cause heat damage to components on any recommended tap. It is always advisable to use the maximum speed (air flow) that the level of noise permits to extend component life. Wiring information for the blower is shown in the "Transformer Connections" instructions on page 6.

PLATE SUPPLY

The plate supply has a full wave bridge rectifier and a 1.8 KVA CCS rated tape wound hypersil transformer. Filtering is accomplished by a bank of high quality capacitors totaling 26 mfd (additional capacitance will not improve supply performance). The Plate Supply will not be harmed by normal continuous amateur operation at 1500 watt levels. Power is applied through RLY2 when the 12V DC low voltage supply is activated. A 10 ohm resistor limits the line current during the filter capacitor charge time to lower the stress on components. When the primary voltage approaches the full line value, RLY3 shorts the 10 ohm resistor and applies the full line voltage to the plate transformer. The 10 ohm resistor acts as a fuse during start-up if the high voltage supply has a short.

EXPORT MODIFICATIONS

A simple modification will allow operation on frequencies above 15 meters. Instructions for this modification are available by sending a written request for "Export Modification Instructions" along with a copy of a valid amateur license. There is no charge for this information. Export models are shipped with this modification and have an "X" or "J" following the serial number. Standard frequency coverages are indicated in the chart following the tuning instructions on page 10.

TECHNICAL ASSISTANCE

Technical assistance is available during our normal business hours on weekdays. The following information is required to assist you with operational problems:

1. Name and daytime phone number
2. Model and Serial Number
3. Date of purchase and dealer

Meter readings at all stages of the tuning proceedure are very important along with a complete description of the other equipment used with our product.

Written assistance is also available. Due to time delays in processing mail, please allow at least three weeks for a written reply.

AMERITRON

116 Willow Rd. Starkville,
Ms. 39759 Telephone
(601)323-8211 FAX (601)

PERIODIC MAINTENANCE

The high voltage present on the plate choke and air variable capacitors attracts dust and dirt out of the air stream. It is particularly important that the high voltage areas at the bottom of the plate choke and the insulators on the air variable capacitors be dust free. These areas should be inspected every few months if the amplifier is operated in a dusty environment. Unplug the line cord, and wait about 90 seconds until the power supply capacitors discharge. Check the HV scale for zero voltage before removing the cover. Remove the cover and connect a jumper wire from ground to the anode connection of the tubes.

NOTE: This is a safety wire that must be installed when beginning service work. After service is complete, reverse the procedure to remove the safety wire. Remove the wire from the anode connection first and then from ground.

Use a soft bristle brush dipped in alcohol to clean areas mentioned previously. In the event that cleaning is required at frequent intervals, place a low restriction air filter material over the air inlet holes on the left front side of the cabinet near the filter capacitors. Most hardware stores stock suitable materials that are used as replacement filters for window air conditioners.

METERING FUNCTIONS

The AL-82 has two illuminated meters. The Grid Current meter provides a continuous indication of the two 3-500z grid current. This exclusive feature of Ameritron amplifiers indicates proper amplifier operation better than any other parameter. Do not exceed 300 mA on this meter during normal operation of this amplifier. The other meter reads Plate Voltage (HV), Plate Current (Ip), Peak RF Watts (PO) and ALC. These functions are selected with the Multimeter Switch.

Plate Voltage (HV): Read DC Plate Voltage on the 4000 volt scale. This scale is 100 volts per division. Normal voltages are 3600 volts no load, 3300 volts full load.

Plate Current (Ip): Read Plate current on the 1000 mA scale. This scale is 25 mA per division. The maximum operating current rating of the 3-500z is 400 mA SSB or 900
mA CW.

Peak RF Watts (PO): Read Peak RF Watts on the 2000 watt scale. This scale has 50 watt divisions below 1000 watts and 100 watt divisions above 1000 watts.

NOTE: This circuit uses an emitter follower to charge a capacitor to the peak envelope voltage detected by the ALC/Power Board. Accurate peak envelope power readings are given when the amplifier is connected to a 50 ohm nonreactive load. If the amplifier is used with a mismatched load, the power meter will read higher or lower than normal by a ratio up to the value of the SWR. Potentiometer R5 on the Meter Board (50-01140-1) adjusts the calibration of the power meter.

ALC: Indicates a relative drive level (average, not PEP) that can be estimated by dividing the Peak RF Watts scale by 10.

INSTALLATION

TRANSFORMER INSTALLATION

Remove the cover of the amplifier. Remove the package that is in the plate transformer area. This package contains the chimneys for the AL-82. There is a small bag that contains the fuses, fuse caps and the remainder of the chassis screws wrapped in the packing material around the anode connector. Remove the top 7/16" nuts from the four transformer mounting bolts inside of the amplifier. Carefully remove the transformer from its shipping carton.

Place the transformer on the four 1/4-20 mounting bolts. Use care because the transformer is heavy. The side with the two high voltage secondary RED leads must be adjacent to the center panel(see Fig. 1). Now place a 7/16" nut on each bolt (see Fig. 2). Snug the nuts down manually. Do not tighten with a ratchet wrench.

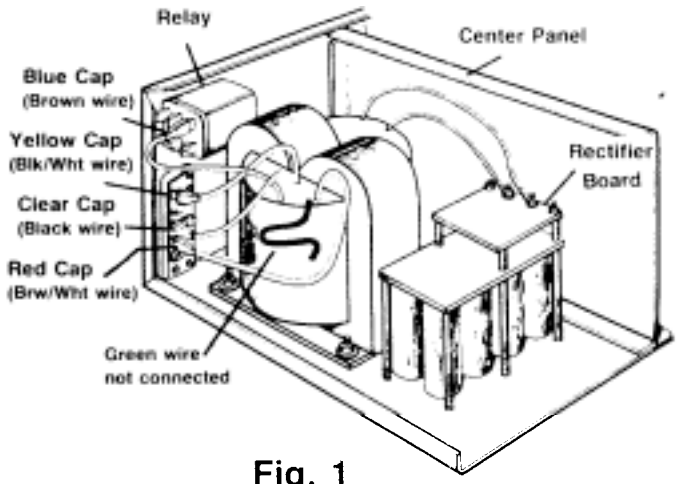
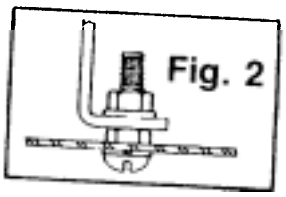


Fig. 1



Remove the brass 1/4" hex nuts and the top flat washer from the two 6-32 screws on the rectifier board (see Fig. 1). Install the RED lead ring terminals on the screws and replace the flat washers and 1/4" hex nuts. Position the wires so that the black insulated areas are at least 1/4" from each other and any metal objects. Now tighten the 1/4" hex nuts.

For 240V Operation (factory wired):

The four primary leads have colored plastic insulating boots over the quick disconnect terminals. Slide these back prior to installing the leads. Install the color coded boots as follows:(see Fig. 1)NOTE: Japanese export model (AL-82J) 82J) should follow the 240V operation steps to properly connect their transformer. The AL-82J is supplied with a special transformer for 200V operation.

1. **BLUE** (Brown wire) to the top relay terminal
2. **YELLOW** (Black/White) to the top terminal of terminal block
3. **CLEAR** (Black wire) to the second terminal of terminal block
4. RED (Brn/Wht) to the bottom terminal of terminal block

Now slide the colored insulating boots back over the terminals. **NOTE:** The green wire is not used for 240V operation. There is no green wire on the AL-82J export model transformer.

Important: The leads must be in the positions indicated by the color coded insulating boots (see Fig. 1) for 240V operation, or for 200V operation in Japan. For 220V operation, see page 5. Caution: Do not use the **220V** wiring unless the line voltage is always below **220 VAC.** The Standard USA voltage is 240 VAC, not 220.

TRANSFORMER INSTALLATION

For 220V connections(see Fig. 3), follow the first three steps on the 240V operation on page 4, then follow the steps below:

1. Slide the RED boot back on the BRN/WHT wire
2. Clip the terminal connector off the wire and slide the RED boot off.
3. Remove the restraint from the GRN wire and slide the RED boot on to the wire.
4. Solder the terminal connector to the GRN wire.
5. Tape up the BRN/WHT wire because it will not be used.

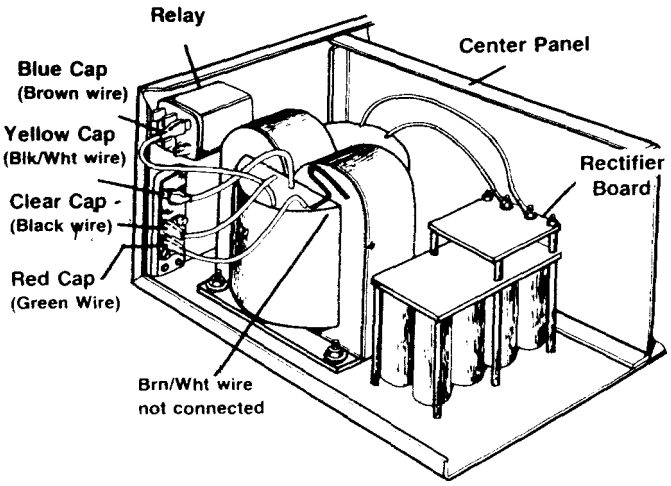


Fig.

TUBE INSTALLATON

Install the tubes, chimneys, anode. bracket and plate cap connectors as follows: (see Fig. 4)

1. After removing the packing material from around the anode connectors, install the 3-500z tubes. NOTE: One of the tube pins is offset. This offset pin "keys" the tube base and socket. Install the tube by aligning the tube pins with the socket contact terminals, then seat the tube with vertical pressure ON-LY. Do not "rock" or "twist" the tube.
2. Place the chimneys over the tubes and seat with the metal clips inside each chimney. Do not apply excessive force or the glass chimney may crack.
3. Attach the blocking capacitors to the anode bracket and secure with the two 6/32 screws.
4. install the plate cap connectors on the tubes in the positions shown. Be careful not to drop any hardware inside the chassis.

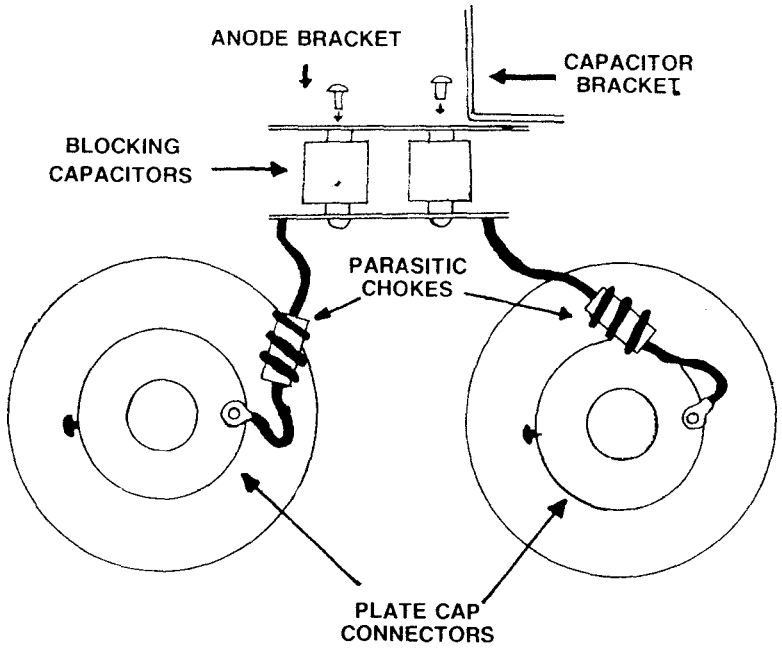
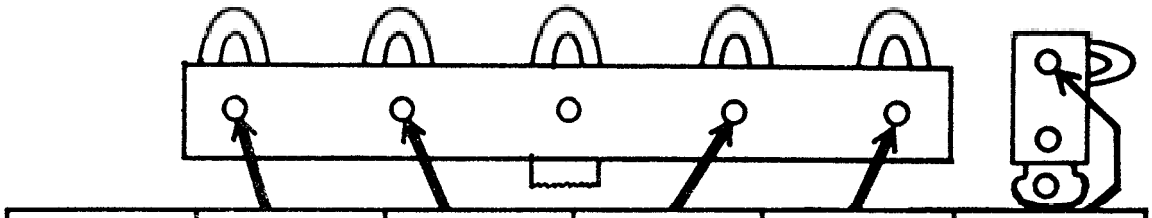


Fig. 4 Top View of 3-500z tubes

Caution: This page is only valid for transformers that contain these exact color codes for the primary winding. Early production units did not contain a multiple tap transformer. If the terminal strip has all these color coded wires, then the unit has the multiple tap transformer.

FILAMENT/BLOWER WIRING INSTRUCTIONS

The AL-82 and 82(X) amplifiers come prewired for 240V line voltage and with the blower prewired for medium high fan speed. NOTE: The AL-82J Japanese export model is prewired for 208V line voltage and with the blower prewired for medium high fan speed.. This page gives filament transformer connection details for various line voltages and blower speeds. The five lug terminal strip and the single lug terminal strip are located immediately behind the ON/OFF rocker switch inside the unit. The drawing below shows the connection of transformer leads and their purpose.



XFMR LEAD	BLACK (1)	BLK/WHT (2)	ORANGE (4)	BROWN (5)	WHITE (6)
PRM V AC	REFERENCE	13 V	220 V	240 V	120 V

This chart shows the color code of the transformer leads and their purpose. The number in parenthesis indicates the number of the terminal lug that the transformer lead is connected to. The number three (3) lug is not used to change the filament or blower wiring. Do not add or remove any wires from the number three (3) lug. Refer to the drawing above. Use the lug numbers above when referring to both of the Filament connection chart and the Blower connection chart below.

FILAMENT TRANSFORMER LINE VOLTAGE There are two wires that connect to the terminal lugs which determine the Filament Line Voltage. The BLACK wire from the power switch and WHITE wire from rear of the unit connect to different terminal lugs depending on the voltage desired. The AL-82 and 82(X) come prewired for 240V operation`. AL-82J comes prewired for 200V operation". Refer to the chart below. The voltage listed in the chart below is the maximum line voltage that should be applied to a given tap. Operation with line voltage in excess of the tap voltage selected can result in a reduction of tube life.

MAXIMUM LINE VOLTAGE

LUGS	245 V*	232 V	220 V	208 V**
1	BLACK		BLACK	
2		BLACK		BLACK
3				
4			WHITE	WHITE
5	WHITE	WHITE		
6				

* indicates factory shipped (AL-82/X) * * indicates factory shipped (AL-82)J

BLOWER CONNECTIONS

The GREEN and WHITE wires from the rear of the unit connect to the terminal lugs to control the air speed of the fan. The AL-82/X/J are prewired for the medium high speed setting'. Refer to the chart below. The blower connections can be moved to lower speed taps if air noise is excessive. Ameritron recommends using the highest speed tap that noise considerations permit. The lowest speed tap will develop sufficient air flow for standard amateur SSB and CW full power operation. The highest speed taps should be used for contest or RTTY operation.

BLOWER SPEED

LUGS	LOW	M LOW	M HIGH*	HIGH
1			BROWN	
2		BROWN		
3				
4	BROWN			
5				BROWN
6	GREEN	GREEN	GREEN	GREEN

* indicates factory shipped

INTERCONNECTION

1. Connect the RF output of the exciter to the RF IN connector on the rear of the AL-82 with 50 ohm coax. Use any good quality 50 ohm cable long enough to connect the amplifier to the exciter. The amplifier uses a standard SO-239 female that will mate to a PL-259 male connector on the cable.

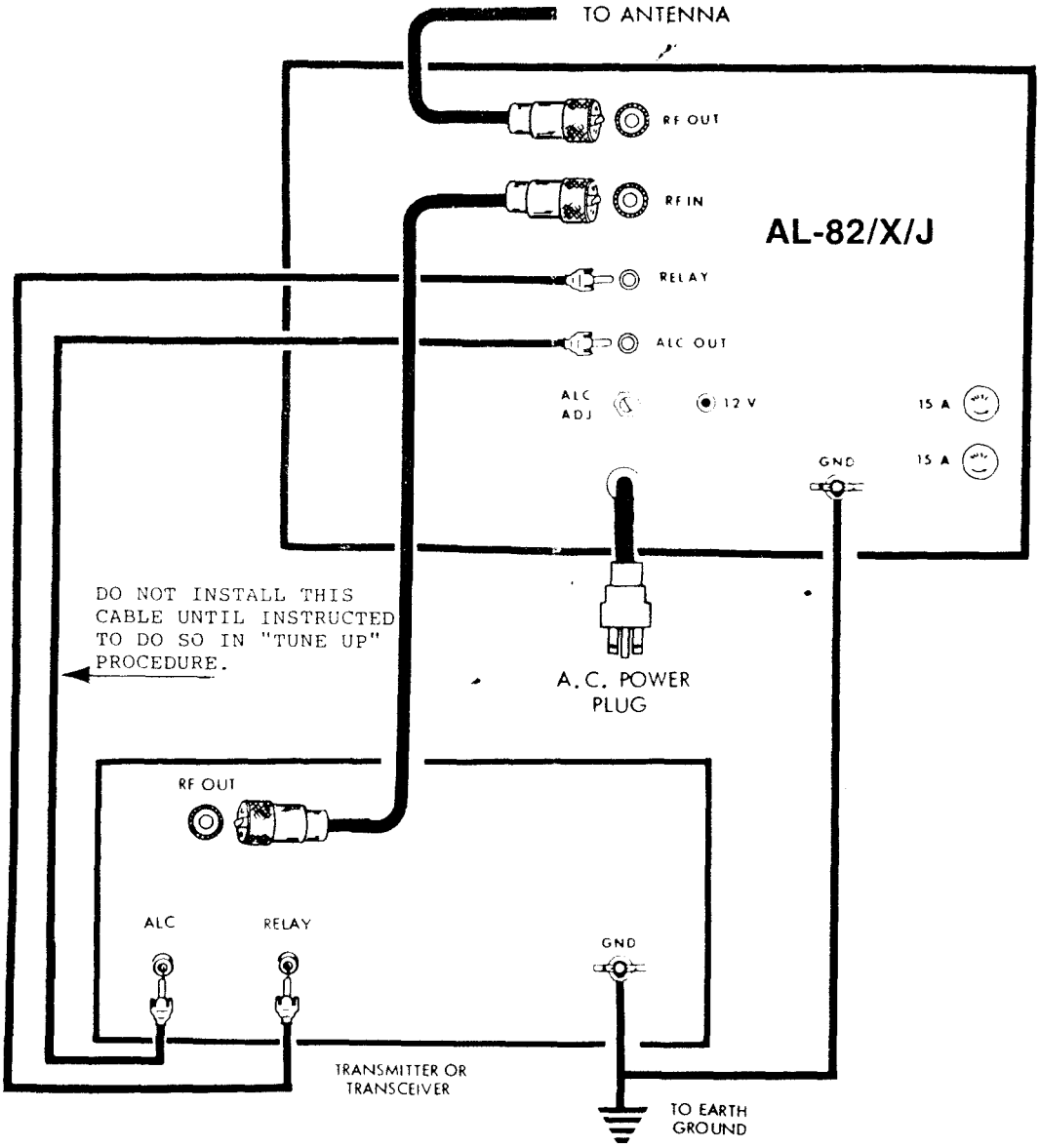
2. Connect the existing station antenna system to the RF OUT connector on the rear of the AL-82 with RG-8 type coax. This connection uses PL-259 connectors.

3. Use shielded audio type cable with standard male phono plugs to connect to the RELAY jack on the AL-82. This jack has positive 12V DC open circuit and supplies 100mA of current when pulled to ground.

4. Connect a short ground lead from a good earth and RF ground to the GND terminal.

5. The 12V connection on the rear panel provides 12V DC at 100 mA maximum to operate external dial lamps or accessories such as the ATR-15 Antenna Tuner.

6. DO NOT CONNECT THE "ALC OUT" SOCKET ON THE AMPLIFIER TO THE "ALC" SOCKET ON THE TRANSMITTER UNTIL INSTRUCTED TO DO SO IN THE TUNE UP PROCEDURE. This jack provides up to 20 Volts of negative voltage for transmitter gain control.



INSTALLATION Cont.

LOCATION

Do not operate the Amplifier in excessively warm locations or near heating vents or radiators. Be sure air can circulate freely around and through the Amplifier cabinet. Provide an unobstructed air inlet for the blower. Do NOT place anything that will impede the free flow of air within 2 inches of the cabinet ventilation holes.

VENTILATION

The AL-82 ventilation system has been designed and tested to maintain tube seal temperature safely below the tube manufacturer's rating at 1500 watts output with a 100% duty cycle when properly tuned. The blower in the AL-82 is a permanently lubricated type that requires no maintainence in normal operation. To insure proper ventilation in your installation, observe the following:

1. Do not block or unduly restrict the ventilation holes in the cover. Be sure that the amplifier is located in an area so the vent holes have open air circulation.

2. The exhaust air flow is over 30 CFM. Do not "assist" the air flow unless the fan exceeds the AL-82 blower CFM by a factor of 2:1.

3. Do not mount additional fans on the AL-82 cabinet.

4. The exhaust air **will** become quite warm at higher power levels. Do not place any heat sensitive objects in the exhaust air stream.

POWER CONNECTIONS

The AL-82 is supplied with a NEMA 6-15P plug for 240V AC operation. Operation with power main voltages below 200 volt is not 'recommended. A special transformer is required for 200V, 50/60 Hz operation (see NOTE on page 1). Refer to the "Transformer Installation" section on pages 4 and 5 for the correct wiring for 220 to 240 volt operation.

NEVER REWIRE THE POWER SUPPLY TO BOOST THE HIGH VOLTAGE ABOVE 3700 VOLTS.

The wiring between the fuse box and the amplifier AC outlet must be No. 12 gauge or larger in order to supply the current required (13 amperes) without a significant drop in the line voltage. The outlet should be fused for 20 amperes.

GROUNDING

Connect a good RF and earth or water pipe ground to the ground post on the rear panel of the Amplifier. Use the heaviest and shortest connection possible.

Before you use a water pipe ground, inspect the connections around the water meter and make sure that no plastic or rubber hose connections are used. These connections interrupt electrical continuity to the water supply line. Install a jumper around any insulating water connections you may find. Use heavy copper wire and pipe clamps. It is best to ground all equipment to one point at the operating position and then ground this point as described above.

TUNING INSTRUCTIONS

Proper tuning of a grounded grid linear amplifier is best accomplished with an understanding of what each control does and v.hat the meters are telling the operator about the condition of TUNE.

The tuning controls function as follows:

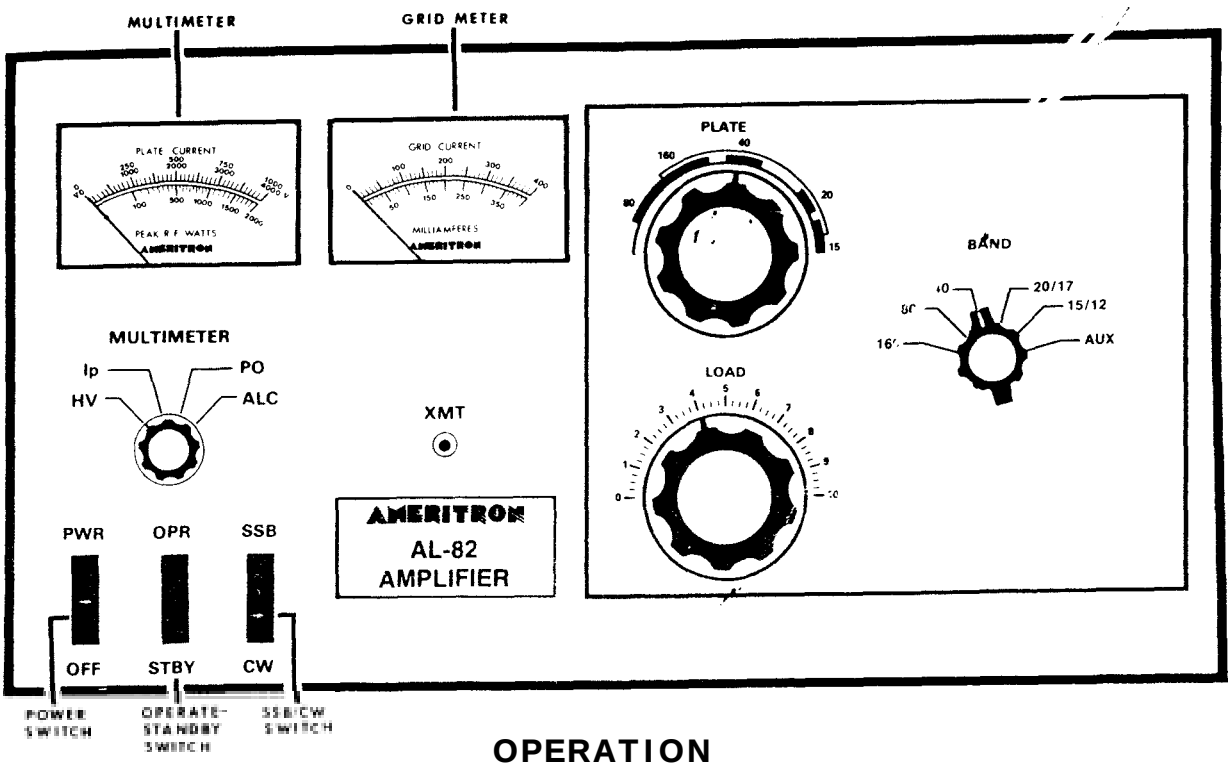
PLATE: This control tunes the amplifier output circuit to the operating frequency. It should always be adjusted for maximum output power or maximum grid current. Due to interaction with the "LOAD" control, a "touch-up" should be performed after any load adjustments.

LOAD: This control adjusts the coupling of amplifier to the antenna or load. It should be adjusted to keep the grid current in the proper operating range. As the loading capacitance is reduced (by rotating the control to a higher front panel number), the coupling is increased. An increase in coupling will reduce grid current and increase the amount of drive the amplifier will accept without component damage.

A common mistake in tuning is to adjust the "LOAD" control at low drive powers and apply more drive during operation. Excessive grid current, distortion on SSB or arcing in the tank components occurs when full drive power is applied to the amplifier without the "LOAD" set far enough clockwise (higher loading).

It is important to remember the loading must be set properly for the PEAK power the amplifier is expected to develop. 50 watts PEP will be the maximum drive the amplifier will safely handle if the output of the amplifier is tuned with 50 watts of carrier drive. Any attempt to go beyond the amount of drive power the amplifier was originally tuned at will result in a rapid increase in grid current, splatter and even damage to components.

The "LOAD" control should be adjusted for maximum output power without exceeding the recommended grid current. DO NOT USE THE LOAD CONTROL TO REDUCE POWER IN A GROUNDED GRID AMPLIFIER. The drive from the exciter should be reduced if the amplifier plate current or output power is excessive. The "LOAD" setting should be increased if grid current is excessive. Any errors in adjusting this control should be made in favor of a higher load setting (clockwise).



OPERATION

CW PROCEDURE

Follow these instructions in numerical order. If the various meter readings are different than indicated, check the connections from the exciter to the amplifier and make sure they are correct. Consult the manual for the exciter.

Be sure the transformer is correctly installed and wired for your line voltage. See the "Transformer installation" section on page 4 and 5 for wiring details.

1. Set the AL-82 front panel switches as follows:
   POWER TO OFF
   OPR-STBY TO STBY
   SSB-CW TO CW
   MULTIMETER TO

2. Plug the AC line cord into the proper voltage outlet.

3. Set the Power Switch to the ON position. The meter lamps should light and the blower should start. Read the 4000 volt scale on the Multimeter. It should indicate 3600 volts nominal and no more than 3700 volts.

4. With the amplifier still on STANDBY, tune the exciter into a normal 50 ohm load according to the manufacturer's instructions. Turn the exciter drive fully down after tuning.

5. Place the amplifier mode switch in the CW position, the bandswitch on the same band as the exciter, the PLATE control in the dial range for the band selected and the load control as indicated:

CW		PHONE (SSB)	
Frequency	Load	Frequency	Load
1.810	2	1.850	3½
3.600	3	3.900	6
7.050	3	7.200	4
14.050	5	14.250	5
21.050	6	21.350	6
28.050	7	28.500	7

6. With exciter drive still at zero, place the MULTIMETER switch in the Ip position. Observe the 1000 mA scale. The meter should read zero (0). Place the STBYOPR switch in the OPR position.

7. Key the exciter (no drive) and observe the plate current on the 1000 mA scale. It should be 75 mA. Place the CW-SSB switch in the SSB position. Plate current should now read 150 mA. Return the CW-SSB switch to the CW position.

Note: The no drive currents will vary up to 25% due to component and line voltage tolerences.

8. Apply only enough drive to indicate a grid current of 100 mA or an Ip of no more than 500mA. Tune the PLATE control for maximum output power or grid current. It is normal for the plate current to dip at this point. If the grid current goes over 150 mA, reduce the drive at once. Unkey the exciter.

9. Place the MULTIMETER switch in the PO position and observe the 2000 Peak RF Watts scale. Increase the drive until 200 mA of grid current is indicated. Adjust the LOAD and PLATE controls for maximum output. The grid current may be lower now.

10. Advance the drive to 250 mA of grid current. Adjust the LOAD and PLATE controls for maximum output power. The output should be over 1000 watts now.

11. Apply enough drive to indicate either 1500 watts of output power or 300 mA of grid current. Re-peak the LOAD and PLATE controls. The final grid current should be around 250 mA and the plate current below 900 mA.

ALC (Automatic Level Control)

The primary use of the ALC is to reduce the input drive power to a safe level for the AL-82. The maximum drive that the AL-82 will tolerate is approximately 130 watts. At this drive level the output of the AL-82 may be in excess of 2000 watts when properly tuned. The ALC should be connected and adjusted after the amplifier is properly tuned on CW. Use a shielded audio-type cable with a standard male phono connector to connect the 0-20 volt negative ALC voltage to the exciter ALC input. Consult the exciter manual for proper connection details.

Setting the ALC ADJ Control

Proper adjustment of the rear panel ALC control can be achieved by the following steps:

1. Load the amplifier according to the tune-up instructions (with the ALC disconnected from the exciter) to the desired maximum power.

2. Connect the ALC line and rotate the ALC control fully clockwise looking at the rear of the unit.

3. Set the MULTIMETER switch to the PO position or observe an external PEP meter or oscilloscope.

4. Set the transmitter audio control about **20oio** higher than normal.

5. Speak in the microphone in a normal tone of voice and observe the reading on the 2000 RF Watts scale.

o. Adjust the ALC ADJ control on the rear panel until the amplifier output is no more than the desired maximum power obtained in step 1.

The exciter internal ALC will maintain linearity. The amplifier ALC will prevent over-power operation.

SSB PROCEDURE

Tune the Exciter and Amplifier as described in "TUNE-UP CW PROCEDURE'".

1. Place the SSB-CW switch in the SSB position.

2. Adjust the exciter gain control to permit voice peaks to reach the same value the peak output meter read on CW when fully loaded. The plate and grid currents should remain well below 50% of the CW values during normal modulation.

SSTV, FM, RTTY, PACKET, AMTOR:

The plate current should be limited to 600 mA maximum. The grid current should be limited to 250 mA. Tune the amplifier for peak output power with the drive reduced to the grid and plate current below the ratings given.

NOTE:

Some t;xciters will put out short duration high power RF pulses when first keyed. Exciter power output peaks may reach or exceed full output level even if the exciter's power control has been adjusted to deliver reduced power under "keydown" conditions.

The amplifier loading control must be set high enough (clockwise) to prevent extremely high energy levels from developing in the plate and grid circuits of the amplifier. DO NOT "UNDERLOAD" THE AMPLIFIER TO REDUCE POWER. Never "retune" the amplifier to produce higher efficiency with reduced drive. Poor linearity, splatter or even damage to components may result from failure to follow these instructions. Exclusive grid current usually indicates that the loading control is set too far counter-clockwise for the amount of drive being applied to the amplifier or that something in the antenna system has changed impedance (arcing) during operation.

The AL-82 will operate with full output on all WARC bands except 24.5 MHz. The AL-82X/J (export models) will operate with full output on all WARC bands.

STANDARD FREQUENCY COVERAGE

AL-82	
160 meters	1.8 - 2.0 MHz
80 meters	3.3 - 4.4 MHz
40 meters	5.9 - 9.0 MHz
20 meters	10.0 - 15.5 MHz*
15 meters	17.0 - 21.5 MHz

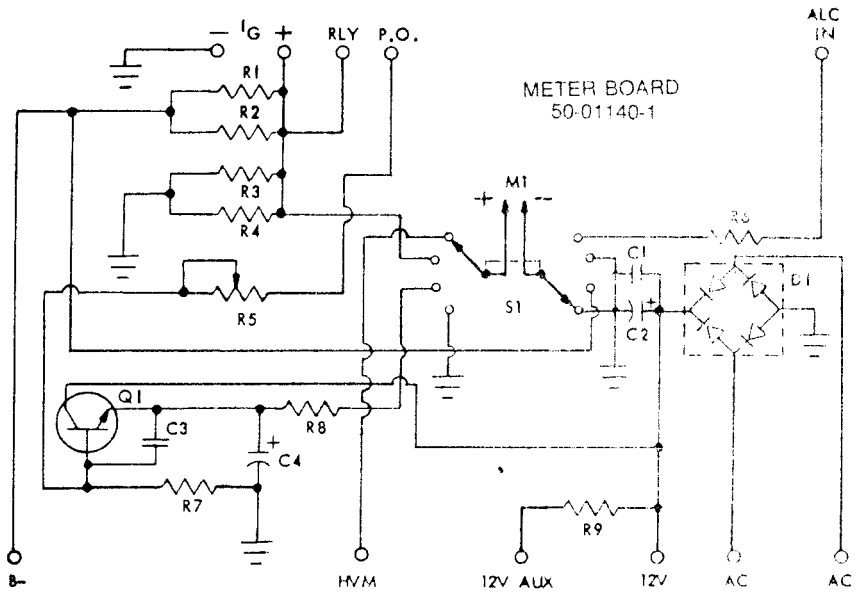
* excluding 11.5 to 12.5 MHz

AL-82X/J	
160 meters	1.8 - 2.0 MHz
80 meters	3.3 - 4.4 MHz
40 meters	5.9 - 9.0 MHz
20 meters	10.0 - 15.5 MHz*
15 meters	17.0 - 21.5 MHz
10 meters	24 - 29 MHz**

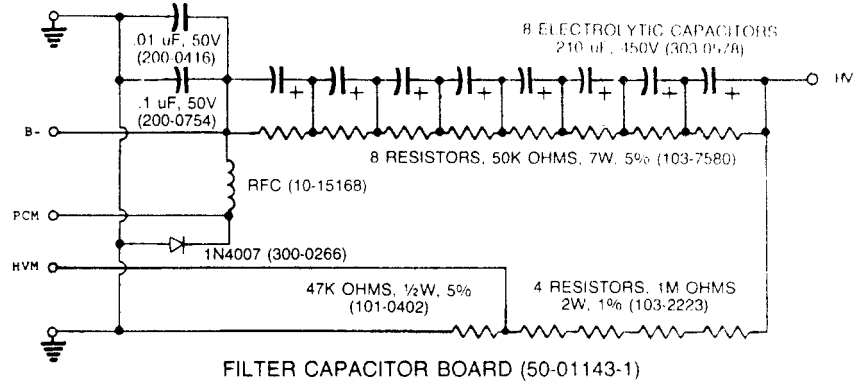
** excluding 26 to 28 MHz

WARNING!!

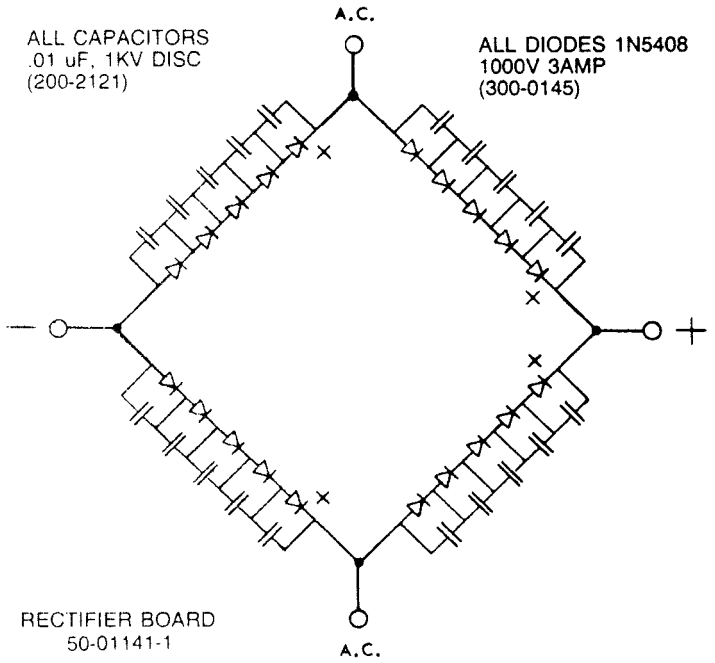
MAKE NO ATTEMPT TO PUT THIS AMPLIFIER IN SERVICE WITH THE COVER REMOVED! CONTACT WITH VOLTAGES INSIDE THIS AMPLIFIER CAN BE FATAL! ALWAYS DISCONNECT THE AMPLIFIER FROM THE POWER MAINS AND WAIT FOR THE FILTER CAPACITORS TO DISCHARGE BEFORE REMOVING THE COVER.

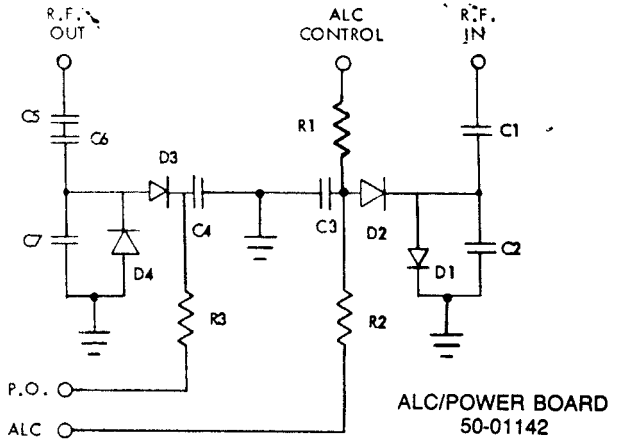


D1	1.5 AMP 50V bridge	300-9646	R1, R2	.6 ohm, 3W, 1%	103-3399
C1, C3	.01 uf 50V disc	200-0416	R3, R4	1.5 ohm, 3W, 1%	103-3400
C2	1000 uf 25V	203-0149	R5	100K ohm trimpot	104-0534
C4	10 uf 25V	203-0642	R6	33K ohm, ½W, 5%	101-0644
Q1	2N3904	305-0645	R7	15K ohm, ½W, 5%	101-0273
			R8	10K ohm, ½W, 5%	101-0643
			R9	10 ohm, ½W, film type	101-0595



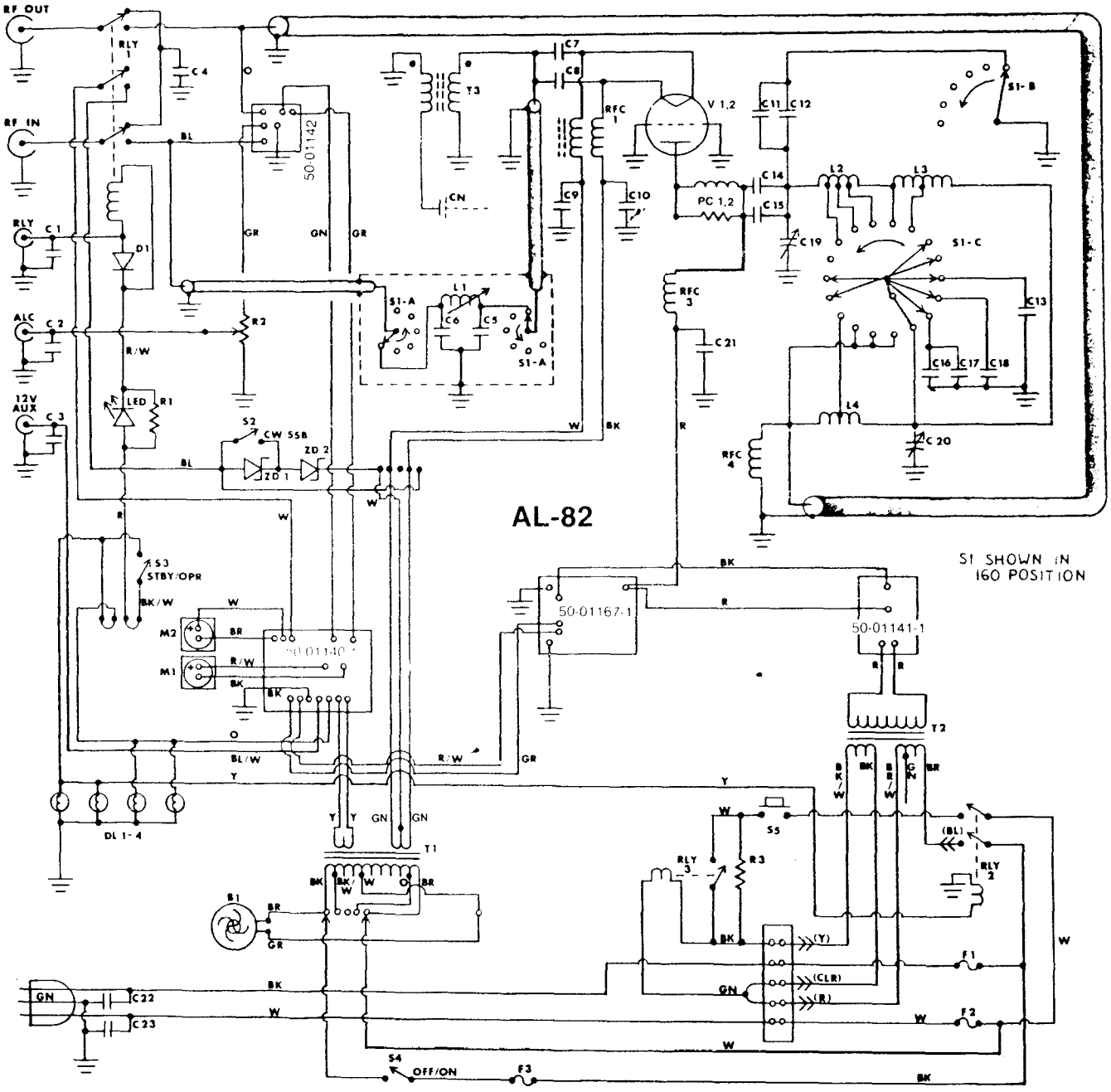
FILTER CAPACITOR BOARD (50-01143-1)





C1	27 pf Silver Mica	208-5404	D1-D4	1N34 or 1N 118 Diode	300-0346
C2, C7	150 pf Silver Mica	208-5396	R1	47K ohm, ½W, 5%	101-0402
C3, C4	.01 uf Disc Ceramic	200-0416	R2, R3	180 ohm, ½W, 5%	101-0384
C5, C6	10 pf Disc Ceramic	200-3531			

AL-82 SCHEMATIC Power supply shown wired for 240V operation



AL-82 INPUT CHART			
BAND	C5 (PF)	L1	C6 (PF)
160	1300 (208-5177)	28t (10-13149)	2000 (208-5608)
80	1500 (208-5382)	18½t (10-13191)	1300(208-5177)
40	500 (208-5691)	11½t (10-13190)	470 (208-5440)
20	220 (208-5175)	9½t (10-13169)	150 (208-5396)
15	180 (208-5605)	5½t (10-13170)	100 (208-5174)
10	150 (208-5396)	3½t (10-13171)	150 (208-5396)

PARTS LIST

Designation:	Description:	Ameritron Part #:
B1	Blower	410-3737
C1-3	.01 uf 50V disc	200-0416
C4	27 pf silver mica	208-5404
C5-6	See input chart	
C7-10	.01 uf 1KV disc	200-2121
C11-13	170 pf doorknob	209-0559
C14-18	500 pf doorknob	209-0412
C19	190 pf 4.5KV plate tuning	204-2570
C20	800 pf 1.2KV loading	204-2573-1
C21	.001 uf 7.5KV disc	200-2122
C22 - 23	.01 uf 1.4KVDC disc	606-1185
D1	1N4005 diode	300-0266
DL1-4	12V wire lead meter lamp	420-0164
F1-2	15A 250V fuse	755-1431
F3	4A 250V fuse	755-1638
Meter Board	Assembly	50-01140-1
HV Rectifier Board	Assembly	50-01141-1
PO/ALC Detector Board	Assembly	50-01142
HV Filter Board	Assembly	50-01143-1
L1	See input chart	
L2	High frequency coil	10-13147
L3	Low frequency coil # 10 airdux	404-0600
L4	"L" coil # 12 airdux	404-0601
M1	Multimeter 1 mA 300 ohm	400-2602
M2	Grid meter 1 mA 300 ohm	400-2603
PC1, 2	Parasitic choke & plate cap assembly	10-10157 (103-2180)
R1	33 ohm ¼w resistor	100-0403
R2	100K ohm ½w resistor	105-1341
R3	10 ohm 12W resistor	103-9701
RFC1	Filament choke	10-15115
RFC3	Plate choke	10-15139
RFC4	2.5 mH choke	402-1162
RLY1	3 PDT 10A 12V DC relay	408-6139
RLY2	SPDT 120V AC relay	408-4700
RLY3	2 PST 30A 12V DC relay	408-2588
S1	6KV @ 20A bandswitch	500-3557
S2-4	Rocker switch	503-1147
S5	Interlock switch	504-3247
T1	HV plate transformer (Japanese Export Version)	406-1418-1D (406-1418-1J)
T2	7.5V filament/control transformer	406-1419-1J
V1,2	3-500Z	350-0167
ZD1,2	7.5V 10W zener diode	301-8597

AMERITRON 116
Willow Road
Starkville, MS 39759

Limited Warranty

Ameritron warrants to the original purchaser that this product shall be free from defects in material (except tubes and RF output transistors) or workmanship for one year from the date of original purchase.

During the warranty period, Ameritron or an authorized Ameritron service facility will provide free of charge both parts (except tubes and RF output transistors) and labor necessary to correct defects in material or workmanship

To obtain such warranty service, the original purchaser must:

(1) Complete and send in the Warranty Registration Card.
(2) Notify Ameritron or its nearest authorized service facility, as soon as possible after discovery of a possible defect, of:
(a) The model number and serial number, if any;
(b) The identity of the seller and the approximate date of purchase;
(c) A detailed description of the problem, including details on the equipment
(3) Deliver the product to the Ameritron or the nearest authorized service facility, or ship the same in its original container or equivalent, fully insured and shipping charges prepaid.

Correct maintenance, repair and use are important to obtain proper performance from this product. Therefore, carefully read the Instruction Manual. This warranty does not apply to any defect that Ameritron determines is due to:

Improper maintenance or repair, including the installation of parts or accessories that do not conform to the quality and specifications of the original parts.
Misuse, abuse, neglect or improper installation.
(2) Accidental or intentional damage.

All implied warranties, if any, terminate one (1) year from the date of the original purchase.

The foregoing constitutes Ameritron's entire obligation with respect to this product, and the original purchaser and any user or owner shall have no other remedy and no claim for incidental or consequential damages. Some states do not allow limitations on how long an implied warranty lasts or do not allow the exclusion or limitation of incidental or consequential damage, so the above limitation and exclusion may not apply to you.

This warranty gives specific legal rights and you may also have other rights which vary from state to state.

PLEASE RECORD THIS INFORMATION:

Model **Serial**

No: Date of Purchase

Purchased From

Warranty Card Mailed